CHAPTER 6

Supporting Hard Drives

Labs included in this chapter:

- **Lab 6.1:** Test Hard Drive Performance Using HD Tune
- **Lab 6.2:** Examine Your Hard Drive Using Four Methods
- **Lab 6.3:** Install a Second Hard Drive for Data Recovery
- **Lab 6.4:** Use Hard Drive Utilities
- **Lab 6.5:** Use SeaTools for DOS

LAB 6.1 TEST HARD DRIVE PERFORMANCE USING HD TUNE

OBJECTIVES

The goal of this lab is to help you use HD Tune to evaluate the performance of your system's hard drives against similar hard drives. After completing this lab, you will be able to:

- Use HD Tune to test the performance of your hard drives
- Use the HD Tune web site to compare your system's drives with similar drives

MATERIALS REQUIRED

This lab requires the following:

- Windows 7 operating system with administrative rights
- Internet access

LAB PREPARATION

Before the lab begins, the instructor or lab assistant needs to do the following:

- Verify that Windows starts with no errors
- Verify that Internet access is available

ACTIVITY BACKGROUND

You can use HD Tune to run routine tests on your drive. You can also use the HD Tune web site to report your results and compare your drive to a selection of comparable drives. This lab gives you an indication of how your drive is performing and whether another product is available that better meets your performance needs. Some tasks, such as video editing, are demanding on the drive where files are stored; a faster drive can increase productivity. When making an upgrade decision, it's helpful to compare results reported by HD Tune to information on other hard drives. In this lab, you use HD Tune to test your drive.

ESTIMATED COMPLETION TIME: 30 MINUTES

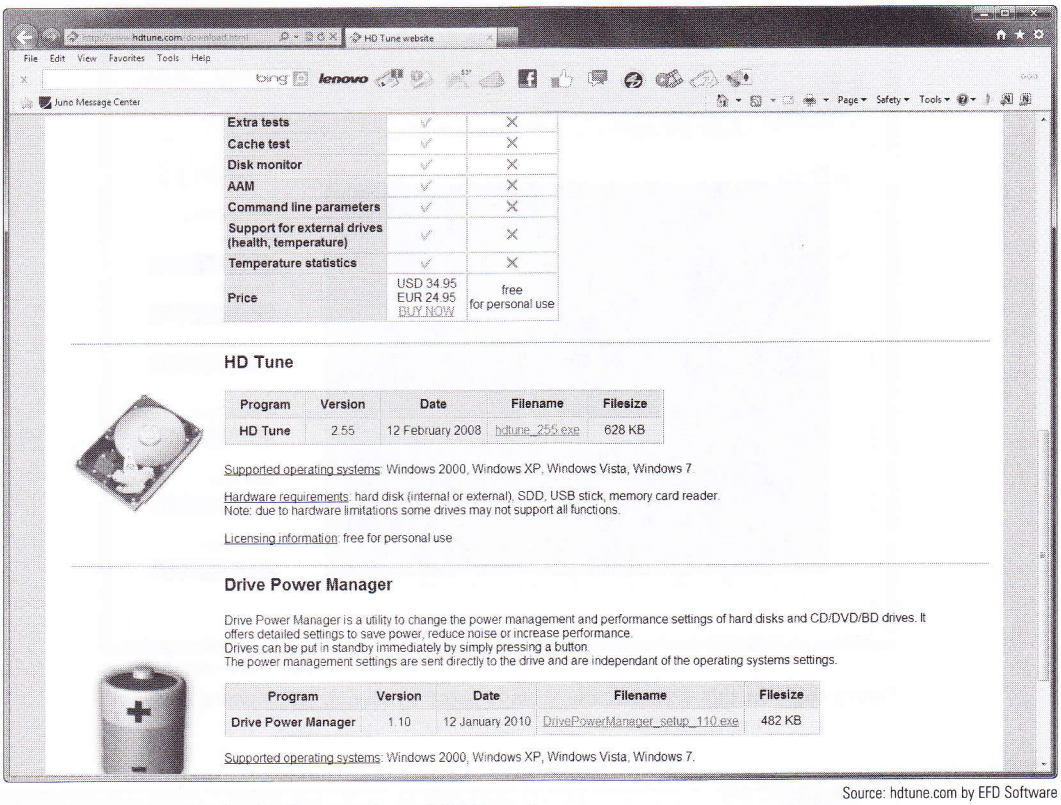
Activity

Follow these steps to download and install HD Tune on your computer:

1. Log on to Windows using an account with administrative privileges.
2. Using your browser, navigate to **www.hdtune.com**.
3. Click the **Download** tab. Scroll down to the HD Tune section as shown in Figure 6-1 and click the filename to download. At the time of this writing, the filename was **hdtune_255.exe**.
4. Save the file to your hard drive. When the download is complete, open the folder where the file is saved. Do not close your web browser at this time.
   - What is the path and filename (including file extension) of the downloaded file? What is the size of the file?

_____

_____


HD Tune website
File Edit View Favorites Tools Help
Juno Message Center
Page Safety Tools
Extra tests
Cache test
Disk monitor
AAM
Command line parameters
Support for external drives (health, temperature)
Temperature statistics
Price
USD 34.95 EUR 24.95 BUY NOW
free for personal use
HD Tune
Program Version Date Filename Filesize
HD Tune 2.55 12 February 2008 hdtune_255.exe 628 KB
Supported operating systems: Windows 2000, Windows XP, Windows Vista, Windows 7.
Hardware requirements: hard disk (internal or external), SDD, USB stick, memory card reader.
Note: due to hardware limitations some drives may not support all functions.
Licensing information: free for personal use
Drive Power Manager
Drive Power Manager is a utility to change the power management and performance settings of hard disks and CD/DVD/BD drives. It offers detailed settings to save power, reduce noise or increase performance.
Drives can be put in standby immediately by simply pressing a button.
The power management settings are sent directly to the drive and are independant of the operating systems settings.
Program Version Date Filename Filesize
Drive Power Manager 1.10 12 January 2010 DrivePowerManager_setup_110.exe 482 KB
Supported operating systems: Windows 2000, Windows XP, Windows Vista, Windows 7.

Source: hdtune.com by EFD Software

Figure 6-1 HD Tune is the free version of HD Tune Pro

5. To execute the downloaded file, double-click the file you just downloaded. If a UAC dialog box appears, click **Yes**.
6. In the Setup – HD Tune dialog box, click **Next** to proceed with the installation. Select the **I accept the agreement** radio button and click **Next**.
7. Click **Next** to select the default destination location. Click **Next** again to select the default Start Menu folder. Click **Next** again, then click **Install** and **Finish**. The HD Tune Hard Disk Utility window appears.

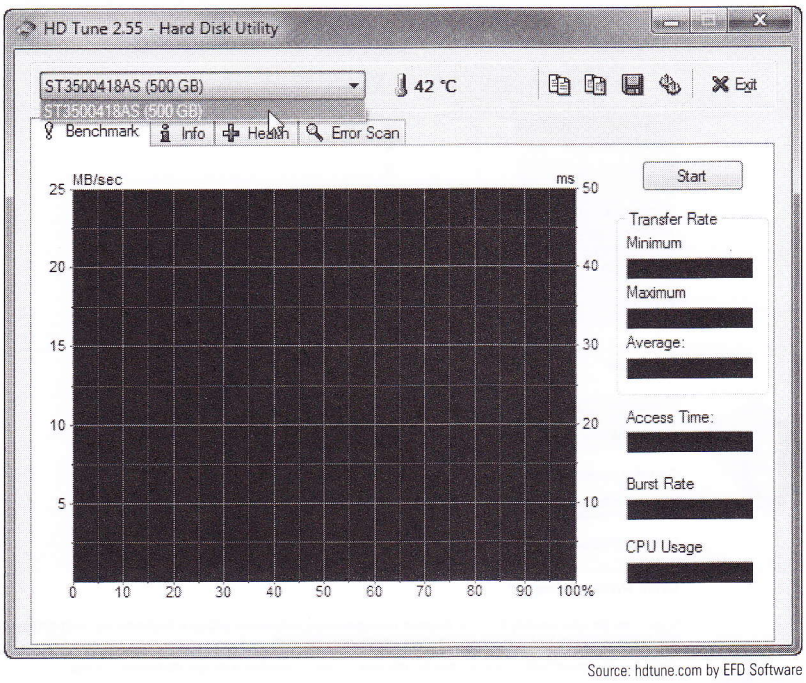
Now that you have installed HD Tune, follow these steps to obtain benchmarks on your system's performance:

1. Make sure the drive you want to scan is selected from the drop-down list. In Figure 6-2, there is only one drive listed. How is your drive displayed in the drop-down menu?

2. Record the following information for your drive. If the information is not listed in the drop-down list, search the web on the information you have from the drop-down list to find the missing information for the table.

Manufacturer	Model Number	Capacity

What temperature is reported for your drive?



Source: hdtune.com by EFD Software

Figure 6-2 In this example, the drive is listed by model, part number, and capacity

Notes Some drives don't monitor temperature and so won't be able to report that information to HD Tune.

3. While running the scan do not move your mouse or do anything on your computer until the scan is complete because this input will affect performance readings. Click the **Start** button to initiate the scan. After the scan is finished, a graph and summary are displayed. Use the summary to complete the following table:

Average Transfer Rate	Access Time

4. Click the **Info** tab.
   - What are the drive's Serial number and Standard?
   - How many partitions are on the drive?

5. Click the **Health** tab and check the reported status for each attribute ID.
   - Are there any attributes that are not OK? If so, list them here:

- What is the overall Health Status of the system?

- The power on time shows how many hours the computer has been on since it was first booted. What is the power on time for this system?

To compare your drive results to other test results on the HD Tune web site, do the following:

1. Return to your browser window and look at the HD Tune web site. Click the **Test results** tab.
2. Using the information you collected earlier, search for your drive's manufacturer and model number in the results list. If your drive is not available, find one that is similar in manufacturer, model number, and/or capacity. Select four reference drives that are closest in size to your drive and note their performance results.

   - List two drives with similar performance results to your drive:

Notes You can sort the results list by Brand/model, Capacity, Maximum Speed, or Access Time by clicking the respective column title.

HD Tune continues to monitor the system's operating temperature and reports this information in the taskbar while the program is open. You can view this data in the taskbar. (You might need to click the Show hidden icons arrow in the taskbar to see the temperature.) The temperature is displayed along with the hidden icons. The temperature by default is shown in Celsius, but the unit can be changed to Fahrenheit in HD Tune's Options menu. Normal temperatures are shown in black font, and critical temperatures are shown in red font. The critical threshold can also be set in the Options menu. The default critical threshold is 55° C.

- What is the current operating temperature?

3. Exit HD Tune and close all open windows.

REVIEW QUESTIONS

1. Why might you want to test your drive with HD Tune?

2. Why is it important to monitor a drive's temperature?

3. Based on the drive ratings information you got from the HD Tune web site, does a higher capacity drive generally perform faster or slower than a lower capacity drive?

4. Why shouldn't you use the system when HD Tune is testing a drive?

5. If the HD Tune results were to indicate an obvious problem with a drive, such as a slow transfer rate, what is another feature of HD Tune you might use to give you additional information about the drive?

LAB 6.2 EXAMINE YOUR HARD DRIVE USING FOUR METHODS

OBJECTIVES

The purpose of this lab is to teach you to examine your hard drive and computer to find information about your hard drive. Upon completion of this lab, you will be able to:

- Identify the manufacturer and model of your hard drive
- Determine the capacity of your hard drive
- Gather other information about your hard drive

MATERIALS REQUIRED

This lab will require the following:

- A computer running Windows 7
- Tools to open the computer case and examine the hard drive
- Internet access

LAB PREPARATION

Before the lab begins, the instructor or lab assistant needs to do the following:

- Verify that the Windows 7 computer starts with no errors
- Verify that students have access to tools needed to open the computer case
- Verify that Internet access is available

ACTIVITY BACKGROUND

In the course of your career you will find yourself frequently dealing with hard drives. It is necessary to be able to determine the vital statistics of your hard drive in order to resolve problems and upgrade systems. Information about your hard drive can be found in multiple locations. In this lab you find this information in four different locations: by physically inspecting the hard drive, looking in the BIOS setup, using a third-party utility, and referring to the manufacturer's documentation.

ESTIMATED COMPLETION TIME: 30 MINUTES

Activity

PART 1: GET INFORMATION BY PHYSICALLY INSPECTING THE DRIVE

Follow these steps to physically inspect your hard drive:

1. Open the computer's case and locate the hard drive seated in a bay.

Notes Because computer cases come in many different configurations you might need to consult the manual for your specific computer and your experience may differ slightly from the instructions here.

2. If you can read the label on the hard drive, you may skip this step. If you cannot read the label on the hard drive, remove the cables (SATA or IDE) and release the drive from its bay and remove it for inspection.
3. Not all labels provide the same information. Using the label on the hard drive, write down the following information if available:

   Manufacturer:

   Model:

   Serial number:

   Part number:

   Capacity:

   SSD drive (yes or no):

4. Inspect the physical connection from the hard drive to the motherboard. What is the interface type?

5. Return the hard drive to its bay, plug it back in, and reassemble the computer.

PART 2: GET INFORMATION USING THE SYSTEM BIOS

The BIOS setup offers information about the hard drive(s) installed on a computer. Follow these steps to gather information about your computer using the system BIOS:

1. Turn on your computer and enter the BIOS setup.
2. Navigate to the drives section of the BIOS.
3. The BIOS uses a string of information to identify the hard drive. Write down this string exactly as it appears in BIOS:

4. Use the information in this string to determine as much of the following information as possible:

   Manufacturer:

   Model:

- Capacity:

- Speed:

5. Using the speed of your hard drive, which version of SATA or PATA is your hard drive (SATA I, SATA II, SATA III or ATA 2, ATA 3, ATA 4, ATA 5, ATA 6, ATA 7)?

6. Is S.M.A.R.T. enabled on your system? What does S.M.A.R.T. stand for?

7. Exit the BIOS setup and allow the computer to boot normally.

PART 3: GET INFORMATION USING THIRD-PARTY SOFTWARE

Third-party software is another method to gather information about the hard drive(s) installed on a computer. Follow these steps to use Speccy to gather information about the hard drive installed on your computer:

1. Speccy might already be installed from a previous lab. If Speccy is not installed, download the Speccy utility by Piriform at **www.piriform.com/speccy**.
2. Open **Speccy** and go to the **Hard Drives** section.
3. Using the information in the Hard Drives section, write down the following information:

- Manufacturer:

- Product Family:

- Interface:

- SATA type (including speed):

- ATA standard:

- Speed, Expressed in Revolutions Per Minute (rpm):

- Transfer Mode:

- Capacity:

- Form Factor:

- S.M.A.R.T. Temperature:

- S.M.A.R.T. Status:

4. Based on the SATA type and the transfer mode, at what speed is your hard drive actually operating in your system?

PART 4: GET INFORMATION FROM THE MANUFACTURER'S WEB SITE

The documentation for the hard drive offers any and all information about a hard drive that you might need. If you do not already have the printed documentation for your hard drive, research on the web to find the documentation from the manufacturer's web site. Complete the following steps:

1. Download the documentation and write down the filename of the documentation:

2. Search through the documentation and determine the technology type of your hard drive. Is the hard drive a magnetic hard drive or an SSD drive?

REVIEW QUESTIONS

1. What important information can you consistently find on the label on a hard drive?

2. What information about the hard drive cannot be found on the label on the hard drive?

3. What four methods do you have at your disposal to learn about your hard drive?

4. In this lab you used a third-party utility to gather information about your hard drive. List two Windows utilities that can give you information about your hard drive. Give the steps you take to access these utilities:

5. What is the advantage of an SSD over a regular magnetic hard drive? What is the advantage of a magnetic hard drive over an SSD drive?

LAB 6.3 INSTALL A SECOND HARD DRIVE FOR DATA RECOVERY

OBJECTIVES

The goal of this lab is to install a second internal hard drive to recover data files. After completing this lab, you will be able to:

- Physically install a second hard drive
- Configure hard drive jumpers for proper operation
- Configure a hard drive in the BIOS setup
- Use Windows Explorer to move files

MATERIALS REQUIRED

This lab requires the following:

- Two computers that can be disassembled
- Cables necessary to attach the drive swapped between the computers
- A PC toolkit with antistatic wrist strap
- A workgroup of two to four students

LAB PREPARATION

Before the lab begins, the instructor or lab assistant needs to do the following:

- Verify that Windows starts with no errors on both computers
- Verify that both computers use compatible hard drives

ACTIVITY BACKGROUND

The precious thing about hard drives is the data they contain. There are times that hard drives may not boot properly and there is a real concern about access to the data stored on the drive. Many times the operating systems may fail to boot up properly. In this lab we will assume your drive fails to boot and you need to install the drive in another workstation so that you can recover the data files.

ESTIMATED COMPLETION TIME: 30 MINUTES

Activity

With your lab partner, decide which workstation has a drive that does not boot properly, and refer to this one as Workstation 1. You will select the other workstation as the data recovery workstation, Workstation 2.

On Workstation 1 follow these steps to create a folder with a couple of files that you will recover:

1. Boot Workstation 1. Open Windows Explorer. Open the Documents library and create a folder named **Recovery**.
2. In the Recovery folder, copy/paste a couple of other library document files into that folder. If no documents are available to copy, create two new document files.
3. Shut down Workstation 1.

Next, you remove the hard drive from Workstation 1 and gather information that you need so you can install the drive into Workstation 2. Follow these steps:

1. Using safety precautions and the antistatic wristband, on Workstation 1 remove the cover and remove the hard drive. Be careful about disconnecting the cables from the hard drive so you don't bend or break connectors.
2. Examine the hard drive and record the following information:

- Manufacturer:
- Model:
- Capacity:
- Interface (PATA or SATA):

If your hard drive's interface is PATA, answer the following questions and review the information to make sure you are able to properly install the hard drive into Workstation 2:

1. If the drive is a PATA drive, jumpers on the drive have been set for the PATA configuration in Workstation 1. These jumpers might need to be changed before you can install the drive in Workstation 2. Does the drive share a data cable with an existing drive or is it the only drive installed on its data cable? Record the drive cable configuration here:
2. If the drive is a PATA drive, view the jumper settings on the drive. How are the jumpers set? Are they CS (cable select), MA (master), or SL (slave)? Record the jumper settings here:

If the PATA drive is sharing a data cable, the jumpers on both drives may need to be configured so that both drives are set to cable select (CS) or one drive is set as master (MA) and one is set as slave (SL). The original drive should be set to (MA) master and the second drive set to (SL) slave. If the jumpers are not set properly, the BIOS might not be able to detect the new drive. If you're unsure about how to set the jumpers, you can either consult the hard drive's documentation or ask your instructor. Most PATA drives are labeled with a diagram showing the proper master and slave jumper settings.

Complete the following steps to install and configure the hard drive from Workstation 1 into Workstation 2:

1. Go to Workstation 2. Remove the case cover and examine the hard drive configuration.
   - Can you locate an unused power connector for the second drive? What type of power connector are you using?

2. If you are installing a PATA drive in a system that already has PATA drives installed, you must decide how the two PATA drives will be configured. Answer the following:

   - Are you installing a PATA drive in a system that already has PATA drives installed? If so, describe how you will configure the PATA system:

   - When installing a PATA drive, what jumper settings, if any, need to be changed on the PATA drive to be installed and/or the PATA drives already installed? Be specific.

3. If your hard drive's interface is SATA, review the information to make sure you are able to properly install the hard drive into Workstation 2. If the drive is a SATA drive, then it will not be sharing a data cable. The SATA system uses one drive per controller/port on the motherboard. Your additional drive will need an additional SATA cable to attach to the motherboard port. Depending on your motherboard you may need to attach the cable to the next available port, such as SATA 1, while your original drive is attached at SATA 0. Answer the following:

   - Is there an extra SATA port for the drive? Which SATA port on the motherboard should you use? Verify the port with your instructor.

4. Install the hard drive from Workstation 1 in a free bay and attach both the data and power cables. Be careful to align the connectors correctly on the back of the drive. The connectors are keyed so that they will insert in only one direction. The same goes for attaching cables to the port on the motherboard. Have your instructor verify your connections.

5. Boot the computer into the BIOS setup screen and ensure that the BIOS automatically detects the new hard drive in the storage section of the BIOS information. Record the information that BIOS gives about the hard drives:

   - If there are PATA drives:
     - IDE Primary:
     - IDE Secondary:
   - If there are SATA drives:
     - SATA 0:
     - SATA 1:

6. Boot the computer into Windows and use Windows Explorer to examine the files on the new drive.

   What is the drive letter designation for the added drive?

7. On the added drive, locate the Recovery folder you made earlier.
8. Copy that folder from the added drive to the Documents library of the C: drive, which will put it on the Workstation 2 original drive.
9. Open the Recovery folder on the C: drive. Are the files you saved into that folder from Workstation 1 there?

You have now recovered data files from a "damaged" system that you installed in another workstation. Complete the following steps to restore your computers to their original configurations:

1. Shut down Workstation 2 and remove the drive you installed and reinstall it in Workstation 1 in its original location. Be sure to use proper safety precautions, including using an antistatic wrist strap. Be mindful to restore the proper jumper and cable attachment configurations.
2. After physical reinstallation, have your instructor verify your work. Reboot and enter the BIOS setup of the workstation to verify in the BIOS that the drive is properly configured. Start Workstation 1 to the Windows desktop and verify all is well.
3. Replace the cover on Workstation 2 and boot it up. Verify you can boot it to the Windows desktop with no errors.

REVIEW QUESTIONS

1. If a hard drive fails to boot, why is it possible to recover data files by installing that drive in another system?

2. What is one way to determine how to set the jumpers on a hard drive?

3. What can happen if the jumpers on both drives in a two-drive PATA configuration are not configured properly?

4. How is installing a PATA drive different from installing a SATA drive?

5. If you installed a second hard drive in a workstation and the BIOS does not report it being on the system, what is a possible cause for this?

LAB 6.4 USE HARD DRIVE UTILITIES

OBJECTIVES

The goal of this lab is to give you an opportunity to work with utilities from hard drive manufacturers that examine and diagnose hard drive problems. After completing this lab, you will be able to:

- Identify your hard drive manufacturer
- Evaluate utilities that hard drive manufacturers provide for their drives
- Test for hard drive problems

MATERIALS REQUIRED

This lab requires the following:

- Windows 7 operating system
- Internet access

LAB PREPARATION

Before the lab begins, the instructor or lab assistant needs to do the following:

- Verify that Windows starts with no errors
- Verify that Internet access is available

ACTIVITY BACKGROUND

Hard drive problems can manifest themselves in different ways. The drive might exhibit immediate and total failure so that it doesn't operate at all. If the failure is caused by a problem with the platters in the area where system files are stored, your computer might not be able to boot at all. If system files aren't affected, you might be able to boot and work normally but could have some file loss or file corruption. Then again, you might never realize you have a hard drive problem if your hard drive has bad sectors because data might not yet be saved to that particular physical area of the disk. More often, however, when a disk begins to fail, Event Viewer in Windows reports errors. One tool you can use to diagnose hard drive problems is diagnostic software that your hard drive manufacturer supplies. In this lab, you identify your drive manufacturer and use its software to examine your drive.

ESTIMATED COMPLETION TIME: 60 MINUTES

Activity

When you need to use a hard drive diagnostic utility, first you must identify your hard drive's manufacturer and model number.

> **Notes** Hard drive manufacturers often abbreviate their names when providing information about their drives. Western Digital Corporation, for example, may be abbreviated as WDC and followed by a model number, or ST for Seagate Technologies, followed by a series of numbers and letters that provide further information.

1. Use the skills you learned in Lab 6.2 to find information about the hard drive you want to test. Record the following information:

   Hard drive manufacturer:

   Hard drive model:

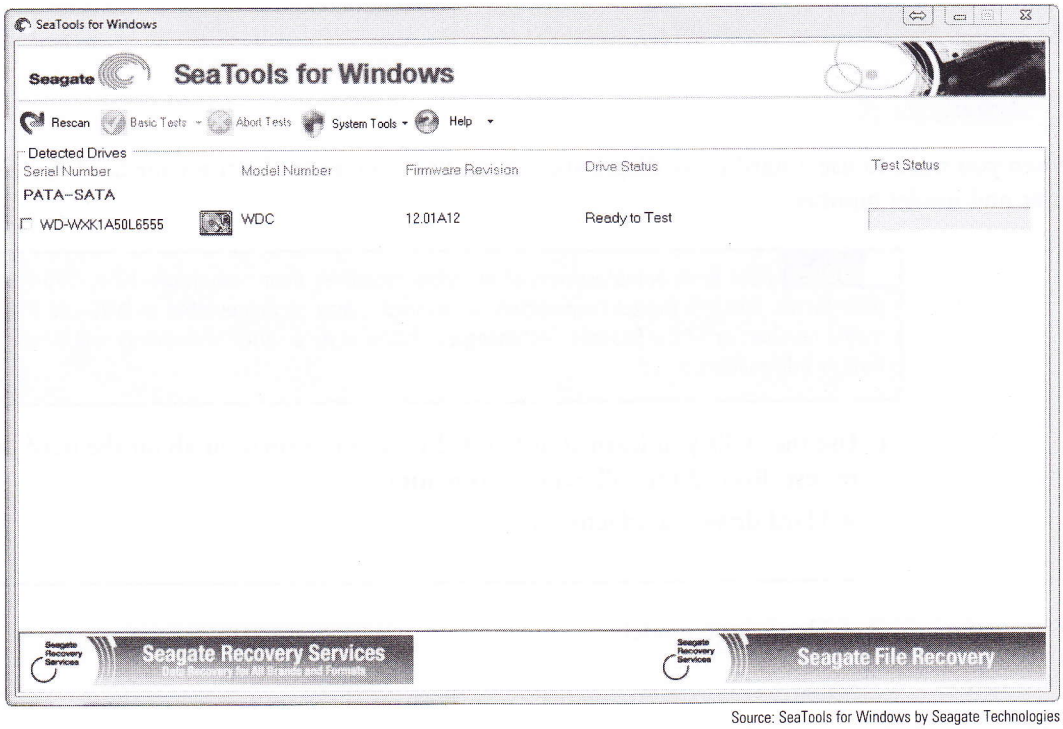
Next, you find out about hard drive utilities supplied by two hard drive manufacturers, Seagate and Western Digital.

> **Notes** Web sites change often. You might need to adjust the steps in this lab to account for changes to the web sites used.

Follow these steps to find out about the Windows version of this software, called SeaTools for Windows that works with Seagate and Maxtor hard drives as well as other brands of hard drives:

1. In your web browser, go to **www.seagate.com/support/downloads/seatools** and click the **Downloads** tab.
2. Under Utilities, Sea Tools for Windows, use the drop-down menu to select the operating system you are working with and then click **Download**. The End User Agreement appears. Click **I Accept.**
3. Read through the SeaTools for Windows installation instructions and click **Download.** Save the file to your hard drive. Locate the file on your hard drive and double-click it. Follow the SeaTools for Windows Setup wizard to install the software. (You might be required to download and install .Net Framework software from Microsoft to complete the installation of SeaTools.)
4. SeaTools for Windows automatically places a shortcut icon on your desktop. Double-click the icon to open the application. The first time you run the software, the EULA may appear. If the EULA appears, click **I Accept**. The SeaTools for Windows window is displayed, as shown in Figure 6-3.
5. Select the drive on which you would like to run a test. On the toolbar, select **Basic Tests**. In the Basic Tests submenu, click **S.M.A.R.T Check**.

   What are the results of the SMART test?



Source: SeaTools for Windows by Seagate Technologies

Figure 6-3 SeaTools for Windows is a useful diagnostic utility for hard drives

6. Select the drive again. In the Basic Test submenu, click **Drive Information** and fill in the following information:
   - Drive Serial Number:
   - Drive Temperature:
   - Power-On Hours:
7. Using the Help feature on the SeaTools for Windows window, answer the following question:
   - What is the difference between a fast and long test?

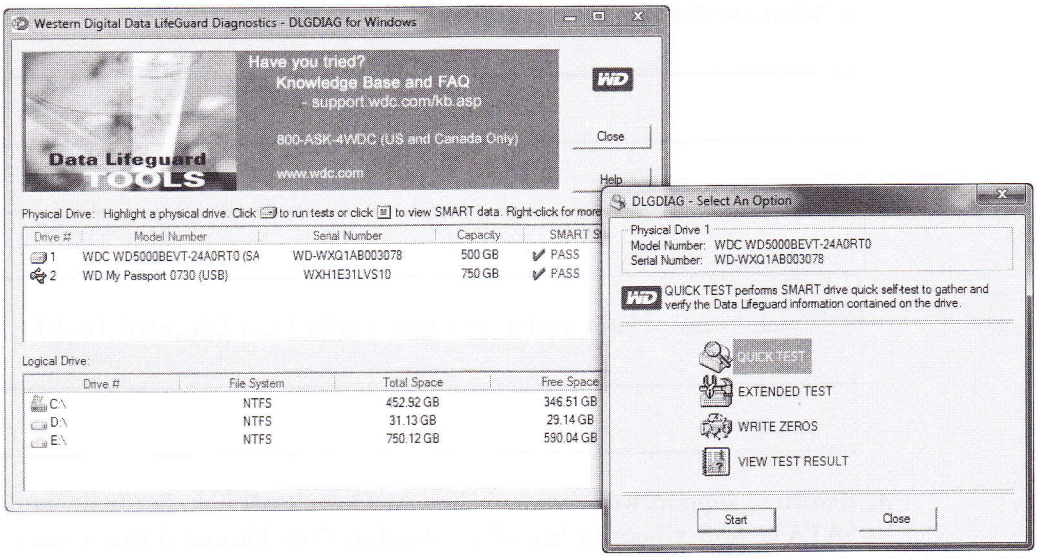
Another very popular tool that Western Digital provides is the Data Lifeguard Tools. Do the following to find out about more about this software:

1. In your web browser, go to **support.wdc.com.** To locate the user manual for Data Lifeguard Tools, enter the search string **Data Lifeguard Tools User Manual** in the Search box in the upper-right corner of the web page. Click the appropriate link in the search results to open the user manual in PDF format.
2. Examine the information and answer these questions:

- What are the four basic functions of this software?

- Which forms of boot media are supported by Data Lifeguard Tools?

3. Return to **support.wdc.com** and click the **Downloads** link. In the list of products, click **SATA & SAS**. Choose a hard drive that lists Data Lifeguard Diagnostic as available.
   - Write down the drive model you selected:
   - List the types of Data Lifeguard software available for this drive:
   - What is the advantage of having the utility stored on a bootable CD?
   - What is the file's name and size for the Data Lifeguard Diagnostics for Windows program?
4. Follow the links in the Downloads section to download the utility and save it to a folder on your hard drive.
   - What is the filename and path to the file?
5. Install and run the Data Lifeguard program. The Western Digital Data Lifeguard Diagnostics window is shown in Figure 6-4. Answer the following questions:
   - What type of test does the Quick Test perform?
   - What type of test does the Extended Test perform? How long does the Extended Test take?


Western Digital Data LifeGuard Diagnostics - DLGDIAG for Windows
Have you tried?
Knowledge Base and FAQ
- support.wdc.com/kb.asp
800-ASK-4WDC (US and Canada Only)
www.wdc.com
Data Lifeguard TOOLS
Close
Help
Physical Drive: Highlight a physical drive. Click to run tests or click to view SMART data. Right-click for more
Drive # | Model Number | Serial Number | Capacity | SMART St
1 WDC WD5000BEVT-24A0RT0 (SA | WD-WXQ1AB003078 | 500 GB | PASS
2 WD My Passport 0730 (USB) | WXH1E31LVS10 | 750 GB | PASS
Logical Drive:
Drive # | File System | Total Space | Free Space
C:\ NTFS 452.92 GB 346.51 GB
D:\ NTFS 31.13 GB 29.14 GB
E:\ NTFS 750.12 GB 590.04 GB
DLGDIAG - Select An Option
Physical Drive 1
Model Number: WDC WD5000BEVT-24A0RT0
Serial Number: WD-WXQ1AB003078
QUICK TEST performs SMART drive quick self-test to gather and verify the Data Lifeguard information contained on the drive.
QUICK TEST
EXTENDED TEST
WRITE ZEROS
VIEW TEST RESULT
Start
Close

Source: Data Lifeguard Tools by Western Digital

Figure 6-4 Data LifeGuard Diagnostics software reports information about a drive

- Describe what the Write Zeros option does. What is one purpose of this option?

Next, follow these steps to explore a manufacturer's utility to test your drive:

1. If your hard drive isn't made by Seagate, Maxtor, or Western Digital, go to your manufacturer's web site and search for diagnostic software.
   - What software did you find?
   - Why do you think it's important to test a hard drive with software provided by the manufacturer of the drive rather than that of another manufacturer?

REVIEW QUESTIONS

1. What are some symptoms of hard drive problems listed on the hard drive manufacturers' web sites? List three in order of seriousness:

2. Which hard drive manufacturer's web site was the most informative and easiest to use? Why?

3. Which utility from a hard drive manufacturer seemed to be the most powerful? Why?

4. What were the most common two methods used to run the utilities?

5. Why is it useful to run the utility from a bootable CD rather than from Windows?

6. How do you determine that your system is set to boot from a CD?

LAB 6.5 USE SEATOOLS FOR DOS

OBJECTIVES

The goal of this lab is to have you perform diagnostics on a hard drive to determine its condition. After completing this lab, you should be able to:

- Create a bootable CD with SeaTools installed
- Perform basic diagnostics on a hard drive

MATERIALS REQUIRED

This lab requires the following:

- Windows 7 computer with a CD burner
- Internet access
- Blank CD to create a bootable CD with SeaTools for DOS installed
- Felt tip pen to label the CD
- Small volume on the hard drive volume so that the time needed to run the long test is not too long

LAB PREPARATION

Before the lab begins, the instructor or lab assistant needs to do the following:

- Verify that Windows starts with no errors
- Verify there is a small volume on the hard drive to run the test
- Verify that Internet access is available

ACTIVITY BACKGROUND

Over time hard drives develop errors due to the constant use they receive from writing, deleting, and modifying files that are stored on them. Errors can occur because of confused file pointers, orphaned sectors, and miscalculations in the file tables. Some errors can make the drive faulty or non-bootable. Using a utility, such as SeaTools, can help to repair file structures on the drive. Having the utility installed on a bootable CD is convenient because you can use the CD with any computer without installing the software first. You can also run the test on the hard drive when Windows refuses to boot.

In this lab, first you create a bootable CD with SeaTools for DOS installed, and then you perform tests to determine if there are problems on the drive.

ESTIMATED COMPLETION TIME: 45 MINUTES

Activity

Follow these steps to create a bootable CD with SeaTools for DOS installed.

1. Go to **www.seagate.com/support/downloads/seatools/**. Click the **Downloads** tab.
2. Under SeaTools for DOS, select the OS your computer uses from the drop-down menu. Click **Download**.
3. Click **I Accept** to accept the End User Agreement.
4. Write down the four steps of instructions provided to create the bootable disk.

   Step 1:

   Step 2:

   Step 3:

   Step 4:

   - Using information given on this same page, what operating system is used on the bootable CD created with SeaTools for DOS? What is the web site where you can download this OS?

5. Click **Download** to download the file. What is the filename, file extension, and path to the downloaded file?

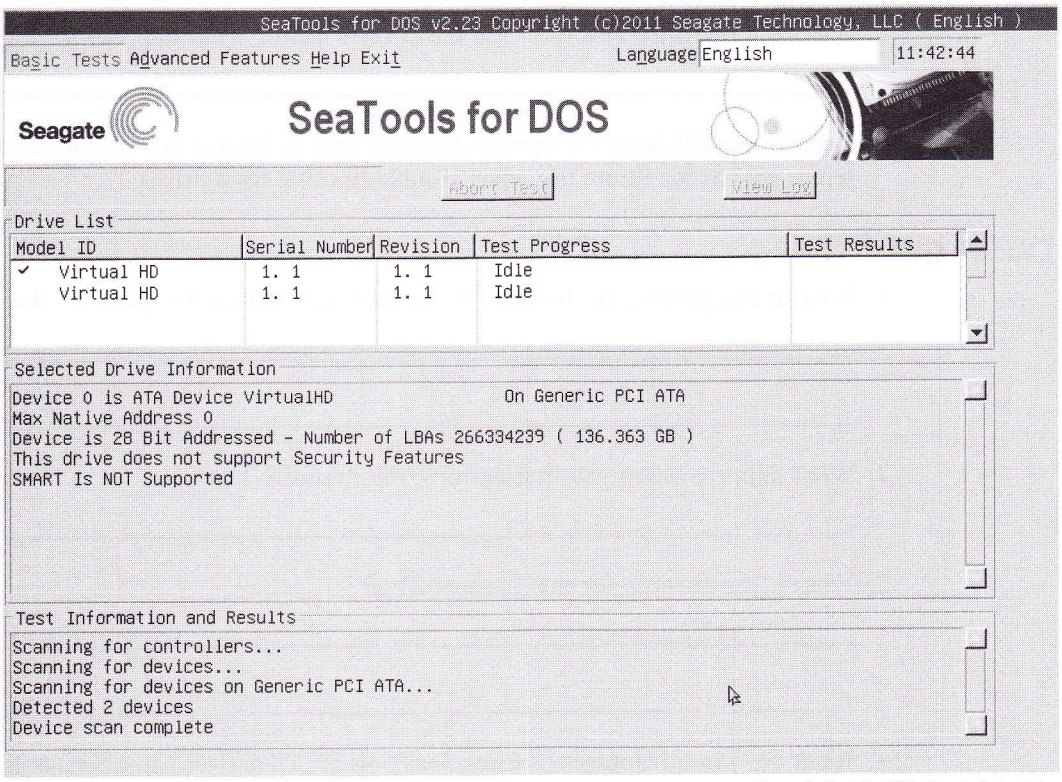
6. Right-click the downloaded file and click **Burn disc image**. Follow the directions on-screen to burn the CD.

> **Notes** If you do not see the option to Burn disc image, your computer might have other burn software installed. Your steps might be different to burn the CD. For example, you might be able to right-click the downloaded file, point to **Open with**, and click **Windows Disc Image Burner**. Then follow the directions on-screen.

7. Remove the CD from the optical drive. Use a felt tip pen to label the CD **SeaTools for DOS**. Also include the date you created the CD.

Follow these steps to run diagnostics of a hard drive using SeaTools:

1. Begin by inserting the SeaTools bootable CD into your workstation and boot to the CD.
2. SeaTools for DOS loads and presents a License Agreement screen. Click **I Accept** to continue. (This is Step 4 you wrote above.)
3. The SeaTools for DOS screen appears. Figure 6-5 shows the screen as it appears when run in a virtual machine. The software will scan your system briefly for available hard drives and list those drives in the Drive List window. If more than one drive is present in your system, all drives should be listed; therefore, select the main drive of your workstation. Write down the identification for the main drive here:



Source: SeaTools for DOS by Seagate Technologies

Figure 6-5 SeaTools for DOS has scanned the system for installed hard drives

4. Using information in the Selected Drive information panel, record the following information about the drive:

Drive Model ID:

- Security features supported:
- SMART enabled?
- Number of LBAs:
- Drive volume size:

5. Select **Basic Tests** from the tools list at the top of the SeaTools window.
6. Select the **Short Test**. This test is about a two-minute test of your hard drive. You can monitor its progress in the Test Progress portion of the Drive List window and the progress bar above it. When completed, did your drive pass the short test?
7. If desired or requested by your instructor, select the **Long Test** from the Basic Tests menu. When completed, did your drive report any errors?
8. Select the **Acoustic Test** from the Basic Tests menu. What happens during this test?
9. Remove the CD from the optical drive. Be sure to keep it in a plastic cover in your PC repair toolkit for future use when troubleshooting hard drives.

REVIEW QUESTIONS

1. What is the purpose for having the SeaTools for DOS utility perform the long test?
2. What happens when you first perform the Acoustic Test?
3. What is the purpose for the Acoustic Test?
4. What are two advantages of using SeaTools for DOS over using SeaTools for Windows?